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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/659,190	09/10/2003	Masayuki Takashima	600630-8US (562653)	5605

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2005 MARKET STREET, SUITE 2200  
PHILADELPHIA, PA 19103

EXAMINER

WEBB, GREGORY E

ART UNIT PAPER NUMBER

1751

DATE MAILED: 01/03/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

10/659,190

Applicant(s)

TAKASHIMA, MASAYUKI

Examiner

Gregory E. Webb

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 11 October 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 6-10 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 6-10 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

## Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

## Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

*[Signature]*  
12/27/05

## **DETAILED ACTION**

### ***Response to Arguments***

Applicant's arguments filed 10/11/2005 have been fully considered and found persuasive. As such, previous rejections are withdrawn.

### ***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

The changes made to 35 U.S.C. 102(e) by the American Inventors Protection Act of 1999 (AIPA) and the Intellectual Property and High Technology Technical Amendments Act of 2002 do not apply when the reference is a U.S. patent resulting directly or indirectly from an international application filed before November 29, 2000. Therefore, the prior art date of the reference is determined under 35 U.S.C. 102(e) prior to the amendment by the AIPA (pre-AIPA 35 U.S.C. 102(e)).

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Claims 6, 8-10 are rejected under 35 U.S.C. 102(b) as being anticipated by Leon et al (US 6,030,932).

Concerning the basic compound, Leon teaches the following:

5. The composition of claims 5 wherein said quaternary ammonium hydroxide compound is selected from the group consisting of: tetramethylammonium hydroxide, tetraethylammonium hydroxide, trimethyl hydroxyethylammonium hydroxide, methyl tri (hydroxyethyl) ammonium hydroxide, and tetra(hydroxyethyl)ammonium hydroxide.(see claim 5)

Concerning the sugar alcohol, Leon teaches the following:

Japanese Patent Application No. 7-028254, assigned to Kanto Kagaku, discloses a non-corrosive resist removal liquid comprising a sugar alcohol, an alcohol amine, water, and a quaternary ammonium hydroxide (see col. 2, lines 31-34; further noting that this reference teaches the required components of claim 6)

Concerning the chemical mechanical polish, Leon teaches the following:

This invention relates to a cleaning composition and method for use in microelectronics manufacturing, and more particularly to a non-corrosive cleaning composition and method for removing photoresist, plasma etch and chemical-mechanical polishing (CMP) residues on substrates.(see col. 1, lines 10-15)

Concerning the optional alcohol solvent, Leon teaches the following:

6. The composition of claim 3 wherein said amine is selected from the group consisting of: monoethanolamine, diethanolamine, triethanolamine, diethylene glycolamine, and N-hydroxyethylpiperazine.(see claim 6)

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Concerning the saccharides, sugar alcohols and the glucose, Leon teaches the following:

U.S. Pat. No. 5,174,816 to Aoyama et al. discloses a composition for removing chlorine remaining on the surface of an aluminum line pattern substrate after dry etching, which composition comprises an aqueous solution containing 0.01 to 15% by weight of a quaternary ammonium hydroxide, such as trimethyl (2-hydroxyethyl) ammonium hydroxide, and 0.1 to 20% by weight of sugar or sugar alcohol, such as xylitol, mannose, glucose and the like.(see cols. 2-3)

Claims 6, 8-10 are rejected under 35 U.S.C. 102(b) as being anticipated by Seijo (US6773873).

Concerning the basic compound, tetramethylammonium hydroxide and the optional alcohol solvent, Seijo teaches the following:

Organic acids useful in the buffering system of the instant invention include but are not limited to: formic acid, trifluoroacetic acid, propionic acid, butyric acid, valeric acid, heptanoic acid, lactic acid, oxalic acid, malic acid, malonic acid, succinic acid, fumaric acid, adipic acid, benzoic acid, phthalic acid and citric acid. Conjugate bases useful in the buffering system of the present invention include but are not limited to: a salt of the organic acid, ammonia, tetramethylammonium hydroxide, tetraalkylammonium hydroxide, 2-(methylamino)ethanol, monoisopropanolamine, diglycolamine, N,N-dimethyl-2-(2-aminoethoxy)ethanol, 1-(2-aminoethyl)piperidine,

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1-(2-hydroxyethyl)piperazine, 1-(2-aminoethyl)piperazine, 1-(3-aminopropyl)-imidazole, 1,8-diazabicyclo[5.4.0]undec-7-ene, N,N,N'-trimethylaminoethanolamine, pentamethyldiethylenetriamine, ethylmorpholine, hydroxyethylmorpholine, aminopropylmorpholine, triethanolamine, and methyldiethanolamine. In a preferred embodiment, the buffering system of the present invention, comprises lactic acid and ammonium lactate.(see col. 4, lines 41-60)

Concerning the chemical mechanical polish, polish and the polish, Seijo teaches the following:

The process of wafer fabrication includes a series of putting down layers.

Each layer involves a series of steps, which may comprise all or some of photolithography, etch, strip, diffusion, ion implant, deposition, and chemical mechanical polishing.(see col. 1, lines 15-21)

Concerning the removing polishing agent, Seijo teaches the following:

The cleaning formulation of the instant invention may have multiple cleaning uses and is not limited to post etch and resist residue removal.

For example, the cleaning formulation of the instant invention when diluted with water in a ratio of from about 1 part formulation to 12 parts water, is useful for post chemical mechanical polishing cleaning.(see cols. 7-8)

Concerning the optional ester solvents, Seijo teaches the following:

In a further embodiment, the present invention relates to a semi-aqueous cleaning formulation useful for removing particles from a semiconductor substrate, wherein said formulation comprises a buffer system, and

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optionally, a fluoride source and an organic solvent system. Preferably, the organic solvent system is soluble in water. Preferably the organic solvent system comprises at least one polar solvent component. The cleaning formulation may comprise from about 0-95% weight by volume of the solvent system, more preferably between 0 and 80% weight by volume and most preferably between 0 and 70% weight by volume of the organic solvent system. Preferably, at least one component of the organic solvent system comprises an amide or ether functional group. Preferred solvents include but are not limited formamides amide glycol ethers, to N,N-dimethylacetamide, N,N-dimethylformamide, 1-cyclohexyl-2-pyrrolidinone, N-methylpyrrolidone, N-cyclohexylpyrrolidone, N-hydroxyethylpyrrolidone, N-octylpyrrolidone, 1,3-dimethylpiperidone, ethylene glycol, propylene glycol, phenoxyethanol, sulfolane, gamabutyrolactone, butyrolactone, 1,4-butanediol, N,N-dimethylacetoacetamide, N-cyclohexylpyrrolidone, N-octylpyrrolidone, 1-phenoxy-2-propanol, phenoxyethanol, dimethylsulfoxide, diethyleneglycol monobutylether, diethyleneglycol monomethylether, diethylene glycol monoethylether, diethylene glycol monopropyl ether, 1,3-dimethyl-2-imidazolidinone and mixtures thereof.(see col. 5, lines 19-45)

Concerning the saccharides, sugar alcohols and the glucose, Seijo teaches the following:

The corrosion inhibitor serves to react with the substrate surface, which may be metal or non-metal, to passivate the surface and prevent excessive

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etching during cleaning. The cleaning agent is a substance that chelates to specific metal or non-metal components to be removed, leading to soluble components that can be readily removed during polishing. The corrosion inhibitor and cleaning agent for the instant invention are preferably a carboxylic acid. More specifically, the carboxylic acid may be chosen from, but not limited to glycine, oxalic acid, malonic acid, succinic acid, citric acid, tartaric acid, gluconic acid, nitrilotriacetic acid, their salts and mixtures thereof. Alternatively, the carboxylic acid may be a di, tri or tetra carboxylic acid that preferentially has a nitrogen containing functional group. In the most preferred form, the corrosion inhibitor and the cleaning agent are iminodiacetic acid. Other substances useful as corrosion inhibitors and/or cleaning agents include but are not limited to ethylene-diaminetetraacetic acid (EDTA), benzotriazole (BTA), tolyltriazole, BTA derivatives, such as BTA carboxylic acids, boric acid, fluoroboric acid, cystine, haloacetic acids, glucose, dodecyl mercaptan and mixtures thereof.(see cols. 5-6; noting glucose is a saccharide).

Claims 6-10 are rejected under 35 U.S.C. 102(b) as being anticipated by Sakai, Akimitsu (US20030158059).

Concerning the basic compound, Sakai, Akimitsu teaches the following:

[0021] The organic base compound includes organic amines, alkanolamines,



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tetraalkylammonium hydroxides, and the like.

Concerning the sugar alcohol, mannitol, saccharides, sugar alcohols and the glucose, Sakai,

Akimitsu teaches the following:

[0014] The reducing agent includes compounds having lower oxidation states, such as sulfites, thiosulfates, aldehydes, saccharides, sugar alcohols, formic acid and oxalic acid. Concrete examples thereof includes sulfites such as sodium sulfite and ammonium sulfite; thiosulfates such as sodium thiosulfate and ammonium thiosulfate; aldehydes such as formaldehyde and acetaldehyde; saccharides such as pentoses such as arabinose, xylose, ribose, xylulose and ribulose, hexoses such as glucose, mannose, galactose, fructose, sorbose and tagatose, heptoses such as sedoheptulose, disaccharides such as trehalose, saccharose, maltose, cellobiose, gentiobiose and lactose, trisaccharides such as raffinose and maltotriose, and polysaccharides composed of each monosaccharide; sugar alcohols such as pentitols such as arabitol, adonitol and xylitol, and hexitols such as sorbitol, mannitol and dulcitol; formic acid, oxalic acid, succinic acid, lactic acid, malic acid, butyric acid, pyruvic acid, citric acid, 1,4-naphthoquinone-2-sulfonic acid, ascorbic acid, isoascorbic acid, and the like, and derivatives thereof and the like.

Concerning the chemical mechanical polish and the semiconductor, Sakai, Akimitsu teaches the following:

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[0001] The present invention relates to a detergent composition used for cleaning a semiconductor substrate or a semiconductor device after a step of forming a semiconductor device on a semiconductor substrate such as a silicon wafer, especially after a CMP (chemical mechanical polishing) step, and a cleaning process for a semiconductor substrate or a semiconductor device using the detergent composition.

Concerning the tetramethylammonium hydroxide and the optional alcohol solvent, Sakai, Akimitsu teaches the following:

[0022] Concrete examples of the organic base compound include dimethylamine, trimethylamine, diethylamine, triethylamine, dibutylamine, octylamine, 2-ethylhexylamine, monoethanolamine, diethanolamine, triethanolamine, methylethanolamine, methyldiethanolamine, dimethylethanolamine, monopropanolamine, dipropanolamine, tripropanolamine, methylpropanolamine, methyldipropanolamine, aminoethylethanolamine, tetramethylammonium hydroxide, and the like.

Concerning the optional ketone solvent, Sakai, Akimitsu teaches the following:

[0040] The organic solvent includes hydrocarbons such as amylbenzene and octane; halogenated hydrocarbons such as allyl chloride and 2-ethylhexyl chloride; alcohols such as amyl alcohol and allyl alcohol; ketones such as methyl ethyl ketone and acetylacetone; esters such as diethyl adipate and ethyl acetoacetate; polyhydric alcohols such as ethylene glycol and propylene glycol; polyhydric alcohol alkyl ethers such as butyl diglycol

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and ethylene glycol monobutyl ether; carboxylic acids such as isovaleric acid and 2-ethylhexanoic acid and acid anhydrides thereof; phenols such as ethylphenol and octylphenol; nitrogen-containing compounds such as acetamide and aniline; sulfur-containing compounds such as diethylsulfate and thiophene; and fluorine-containing compounds such as dichlorodifluoromethane and trifluoroacetic acid. Among them, the polyhydric alcohols are preferable in consideration of market availability, hazardous nature and the like.

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Gregory E. Webb whose telephone number is 571-272-1325. The examiner can normally be reached on 9:00-17:30 (m-f).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Yogendra Gupta can be reached on 571-272-1316. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Gregory E. Webb  
Primary Examiner  
Art Unit 1751

gew